

## CLAIMS

What is claimed is:

1. A multi-rate Reed-Solomon coding device, comprising:
  - 5 a plurality of multiple degree subfilters, said plurality being less than a maximum number of bytes of redundancy provided by said Reed-Solomon coding device.
  - 10 2. The multi-rate Reed-Solomon coding device according to claim 1, wherein:
    - a first rate of said multi-rate Reed-Solomon coding device having a number of bytes of redundancy of a degree of a first one of said plurality of multiple degree subfilters.
  - 15 3. The multi-rate Reed-Solomon coding device according to claim 2, wherein:
    - a second rate of said multi-rate Reed-Solomon coding device has a number of bytes of redundancy of a degree of a second one of said plurality of multiple degree subfilters plus said degree of said first one of said plurality of multiple degree subfilters.
  - 20 4. The multi-rate Reed-Solomon coding device according to claim 3, wherein:
    - a third rate of said multi-rate Reed-Solomon coding device has a number of bytes of redundancy of a degree of a third one of said plurality of multiple degree subfilters, plus said degree of said second one of said plurality of multiple degree subfilters, plus said degree of said first one of said plurality of multiple degree subfilters.

5. The multi-rate Reed-Solomon coding device according to  
claim 2, wherein:

    said degree of said first one of said plurality of multiple  
    degree subfilters is 14.

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6. The multi-rate Reed-Solomon coding device according to  
claim 3, wherein:

    said degree of said second one of said plurality of multiple  
    degree subfilters is 8.

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7. The multi-rate Reed-Solomon coding device according to  
claim 4, wherein:

    said degree of said third one of said plurality of multiple  
    degree subfilters is 2.

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8. The multi-rate Reed-Solomon coding device according to  
claim 1, wherein:

    said plurality is three.

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9. The multi-rate Reed-Solomon coding device according to  
claim 8, wherein:

    said number of bytes of redundancy is 24.

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10. A method of providing multiple Reed-Solomon codes in  
a single coding device, comprising:

    for each Reed-Solomon code, grouping a plurality of  
    subfilters into a multiple degree polynomial subfilter; and

    optionally cascading each grouped plurality of multiple  
    degree polynomial subfilters.

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11. The method of providing multiple Reed-Solomon codes in a single coding device according to claim 10, wherein said grouping comprises:

judiciously pairing said plurality of subfilters into symmetric  
5 generators.

12. The method of providing multiple Reed-Solomon codes in a single coding device according to claim 10, wherein:

10 said cascaded groups of multiple degree polynomial subfilters have a decreasing degree with respect to an order of said cascading.

15 13. The method of providing multiple Reed-Solomon codes in a single coding device according to claim 10, wherein:

15 said cascaded groups of multiple degree polynomial subfilters have an increasing degree with respect to an order of said cascading.

20 14. The method of providing multiple Reed-Solomon codes in a single coding device according to claim 12, wherein:

20 said cascaded groups of multiple degree polynomial subfilters have degrees of 14, 8 and 2, respectively, in an order of said cascading.

25 15. Apparatus for providing multiple Reed-Solomon codes in a single coding device, comprising:

means for grouping a plurality of subfilters into a multiple degree polynomial subfilter for each Reed-Solomon code; and

30 means for cascading each grouped plurality of multiple degree polynomial subfilters.

16. The apparatus for providing multiple Reed-Solomon codes in a single coding device according to claim 15, wherein said means for grouping comprises:

means for judiciously pairing said plurality of subfilters into  
5 symmetric generators.

17. The apparatus for providing multiple Reed-Solomon codes in a single coding device according to claim 15, wherein:

10 said cascaded groups of multiple degree polynomial subfilters have a decreasing degree with respect to an order of said cascading.

18. The apparatus for providing multiple Reed-Solomon codes in a single coding device according to claim 15, wherein:

15 said cascaded groups of multiple degree polynomial subfilters have an increasing degree with respect to an order of said cascading.

19. The apparatus for providing multiple Reed-Solomon codes in a single coding device according to claim 17, wherein:

20 said cascaded groups of multiple degree polynomial subfilters have degrees of 14, 8 and 2, respectively, in an order of said cascading.

25 20. The apparatus for providing multiple Reed-Solomon codes in a single coding device according to claim 15, wherein:  
said apparatus is an encoder.